

Work Order ID 50873

July 23, 2009 9:51:10 AM

Page 1

Item ID: D212-664-107

Accept

Revision ID: A

Item Name: Crosstube Low Standard Fwd

Setup Start

Stop

Start Date: 7/27/2009 Start Qty: 1.00

Required Date: 8/7/2009 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-147

Rev A

100

0.00

DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

0.00

110

0.00

Packaging

Packaging

Packaging

Memo

0.00

120

0.00

CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

0.00

MP

09-07-30

(14)

8/09/06/14

9/18/14 @ 8

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Page 2

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Required Date: 8/7/2009 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

QC: Date: SPC (Y/N): Date:

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

130	QC15- Crosstube Dimensional Check	0.00							
-----	-----------------------------------	------	--	--	--	--	--	--	--



QC	Memo	0.00				(+U)	φ		
----	------	------	--	--	--	------	---	--	--

Quality Control

140		0.00							
-----	--	------	--	--	--	--	--	--	--



Crosstubes	Memo	0.00							
------------	------	------	--	--	--	--	--	--	--

Crosstubes

1-Drill Rivet holes as per Dwg D212-664-147 using DT8972. □2-Drill pilot holes in tube as per Dwg D212-664-147 □3-Ream hole to finish size in tube as per Dwg D212-664-147 □4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-6

RT 09-08-05

AWM 9-8-6

150	Crosstubes Chemical Conversion	0.00							
-----	--------------------------------	------	--	--	--	--	--	--	--



HandFXtube	Memo	0.00				(7)	φ		
------------	------	------	--	--	--	-----	---	--	--

Hand Finishing Crosstubes

- AWM 9-8-6

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Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

160

QC3- Inspect Part Finish

0.00

2) S o r l o s l o g

(A) /

QC

Memo

0.00

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00

2) S o r l o s l o g

(LC) /

QC

Memo

0.00

Quality Control

180

Outsource process - NDT per QSI038 4.1

0.00

CY 09/08/11 D

Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038 Or Issue P/O: 10/94 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order

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Reference:

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:




Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190  Packaging	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Ensure copy of NDT results attached to work order.								
200  QC	QC5- Inspect part completeness to step on W/O	0.00							
Quality Control	Memo	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D412-664-203								
210  Crosstubes	Crosstubes	0.00							
Crosstubes	Memo	0.00							
Crosstubes	1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff. I/A/R SIKAFLEX -241/-291 BATCH: <u>112391</u>								

CL 09/08/11 ①

MA 09 08 11 ①

MA 09 08 12 ①

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Required Date: 8/7/2009 Req'd Qty: 1.00

Customer:

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Run Start

Approvals: Process Plan: Date: Tooling: Date:

Stop

QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

220

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2 12-Paint outside crosstube with White Imron as per QSI 005 4.2 ☐ PRIME: ☐ Start Time: 10:00 ☐ Finish Time: 11:00 ☐ PAINT: ☐ Start Time: 4:00 ☐ Finish Time: 5:30

⇒ ml 09 08 12 ①

230

0.00



QC14- Inspect Spray Paint

QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

⇒ RT 09-08-13

240

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-147 12- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 13- Instal support with magnobond 6398 per dwg D212-664-147, ☐ cure for 12hrs before packaging. ☐ Time & date of applic

⇒ ml 09 08 13 ①

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Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

250

QC5- Inspect part completeness to step on W/O

0.00

=> 8/2/09/14

(4)

p

QC

Memo

0.00

Quality Control

260

QC4- 100% Inspect kits for completeness

0.00

=> 8/9/09/14

(4)

p

QC

Memo

0.00

Quality Control

270

Packaging

0.00

Rev A

9/8/14/14

sy

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212.664-107

Picklist Print

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Work Order ID: 50873

Parent Item: D212-664-107RevA

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 7/27/2009

Required Date: 8/7/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

D3428-1RevA Manufactured No



Placard

100

Each

18.0000

1.0000

260

already issued 5/8/14

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

18

47310

8

48359

10

140

Each

0.0000

1.0000

1 x 48359 MD 09/08/14

D212-664-107TRNRevA Manufactured No



Crosstube Turning Detail

D3659-1RevB Manufactured No



CUFF

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

8

37426

8

240

Each

346.0000

44.0000

IT 09-08-09

x2

CR3212-4-06 Purchased No



CHERRY RIVET

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

346

107534

346

MD 09/08/12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

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Work Order ID: 50873



Parent Item: D212-664-107RevA



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 7/27/2009

Required Date: 8/7/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D2893-I RevB		Manufactured	No			240	Each	76.0000	2.0000			



2.75 Support

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 76

25657 6

43479 14

46488 18

47109 18

47637 20

ml 09 08 13

D3595-063-450RevA

Manufactured

No

240

Each

55.8000

4.0000



RUBBER CUSHION

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 55.8

38959 2

43210 4.8

46465 49

ml 09 08 13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Picklist Print

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Work Order ID: 50873

Parent Item: D212-664-107RevA

Parent Item Name: Crosstube Low Standard Fwd


Comments:

Start Date: 7/27/2009

Required Date: 8/7/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-35A		Purchased	No			260	Each	42.0000	4.0000			
												
BOLT												

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST

42

111605

42

AN6-36A

Purchased

No

260

Each

77.0000

4.0000

Bolt

4x 111605 MD 08/08/14

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST

77

109632

1

110382

26

111650

50

4x 110382 MD 09/08/14

July 23, 2009 9:51:09 AM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Work Order ID: 50873

Parent Item: D212-664-107RevA

Parent Item Name: Crosstube Low Standard Fwd

Comments:

Start Date: 7/27/2009

Required Date: 8/7/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN960JD616 Washer		Purchased	No			260	Each	398.0000	18.0000			

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	398	
107242	3	
107959	6	
109371	8	
110704	23	
111193	18	
111607	340	

6 X 112314 MD 09/08/14

MS21042L6

Purchased

No

260

Each

779.0000

6.0000

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	779	
105077	22	
110002	257	
111548	100	
111578	400	

6 X 110002 MD 09/08/14

July 23, 2009 9:51:09 AM

Shop Packet Print

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Required Date: 8/7/2009

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Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-25		Purchased	No			260	Each	164.0000	4.0000			
												
Clamp(per MIL-DTL-8783C)												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

164

107456

2

108111

3

108975

17

109181

48

109644

10

111282

50

111429

25

111883

9

ml 09 08 13

July 23, 2009 9:51:09 AM

Shop Packet Print

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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PARTS LIST:

Qty	Part Number	Description
X	D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
1	D6019-128	CROSSTUBE
2	D2893-1	SUPPORT
4	D3595-063-450	RUBBER CUSHION
2	D3659-1	CUFF
4	MS21920-25	CLAMP (OR MS21920-26)
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-2411-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.53±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY.
TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE
TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A
VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1
THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE
D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE
CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY
AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A
LAYER OF SIKAFLEX-2411-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN
CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

Wlo
50873

DEO ATTACHED

RELEASED
07.09.24

A		07.07.07	NEW ISSUE
DESIGN	q	DRAWN BY	q
CHECKED	q	APPROVED	q
DATE	07.07.07	DRAWING NO.	D212-664-147
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		TITLE	CROSSTUBE (205/212/412 LOW FWD) NTS

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

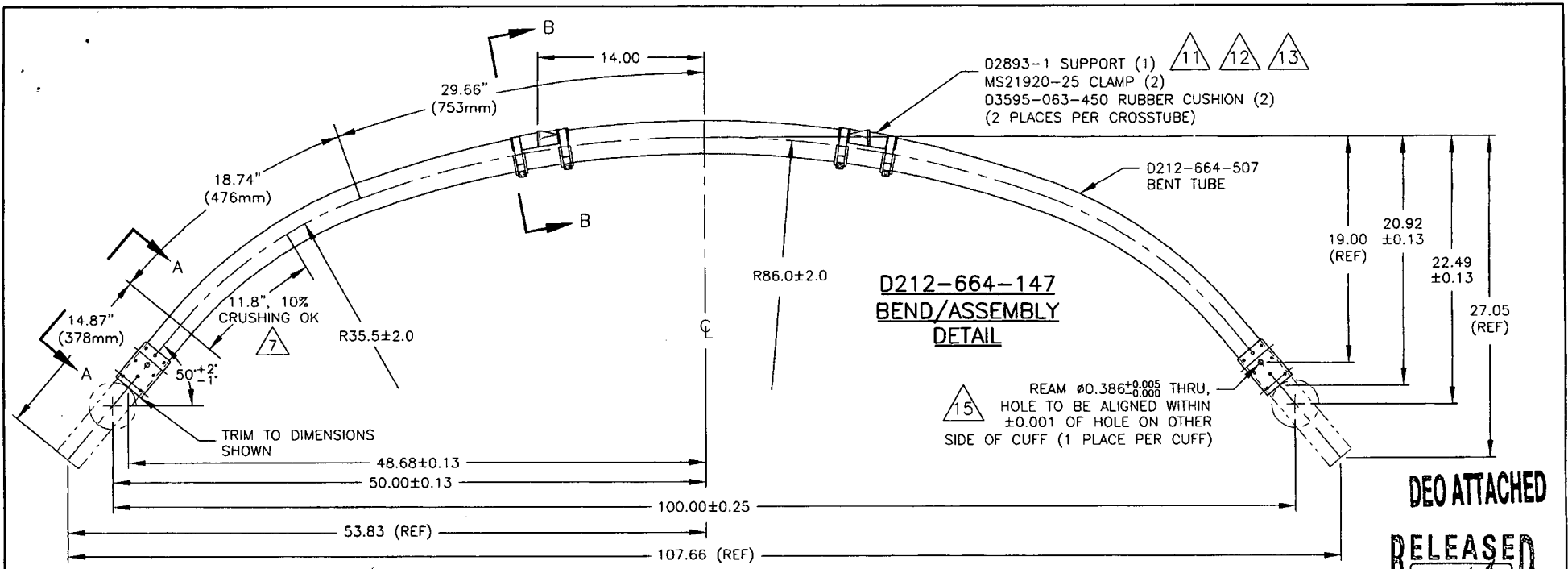
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

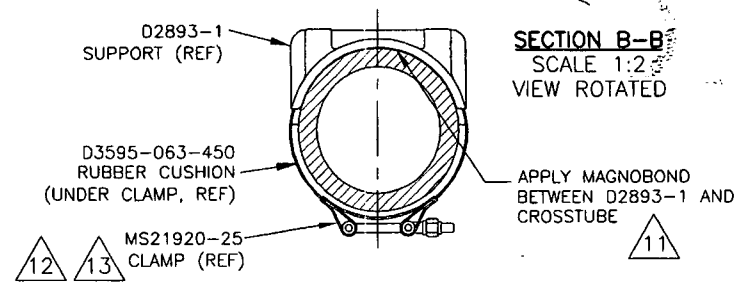
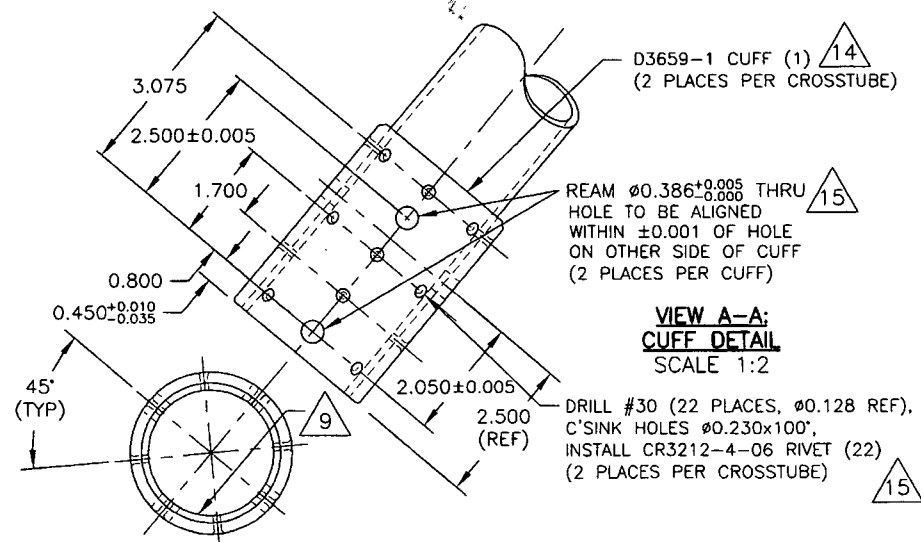
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

WFO 50873



DEO ATTACHED
 RELEASED
 01.09.24



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THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED 97	APPROVED 97	DRAWING NO. D212-664-147	REV. A SHEET 2 OF 3
DATE 07.07.07		TITLE CROSSTUBE (205/212/412 LOW FWD)		SCALE 1:8	

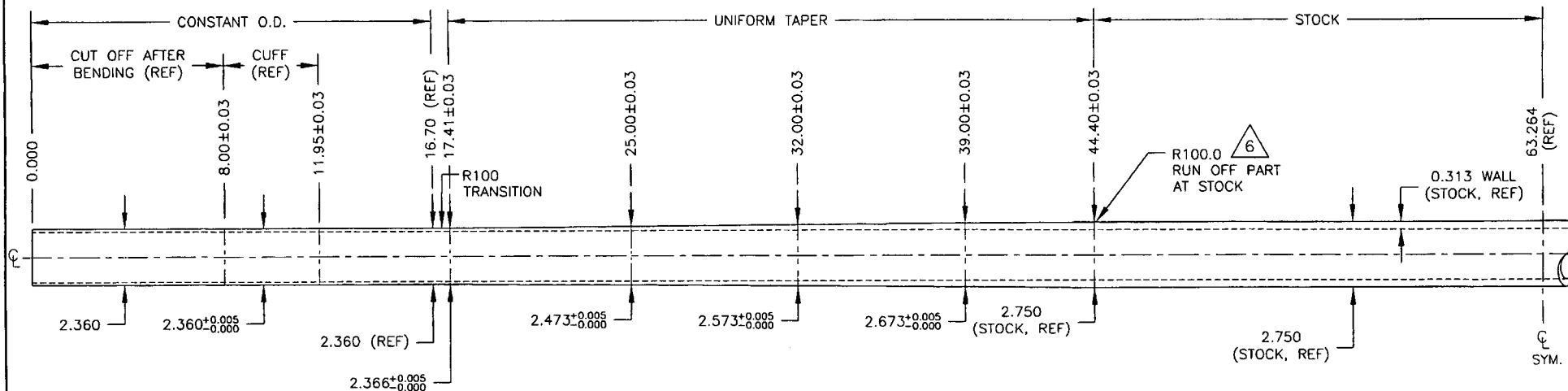
W/O:		WORK ORDER CHANGES					
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D212-664-147 MACHINING DETAIL

RELEASED
07.09.24

DEO ATTACHED

W/0 50873

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THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED pjt	APPROVED jt		
DATE 07.07.07		DRAWING NO. D212-664-147		TITLE CROSSTUBE (205/212/412 LOW FWD)	SCALE 1:4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DRAWING NO. D212-664-147	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-147-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>CD</i>	CHECKED <i>PA</i>	MFG. APPR. <i>E</i>	APPROVED <i>MD</i>		DE APPR. <i>TH</i>		
DATE • 09.05.01	DATE 09.06.15	DATE 09.06.15	DATE 09/06/16		DATE 09/06/16		

CHANGE:

ADD THE FOLLOWING CROSSTUBE ASSEMBLY:

Part Number	Description
D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)

THE D212-664-147B CROSSTUBE HAS THE SAME PARTS LIST AS THE D212-664-147 CROSSTUBE. HOWEVER, INSTALL THE SUPPORTS AS SHOWN IN FIGURE 1 OF THIS ENGINEERING ORDER. THE NEW KIT IS OTHERWISE ASSEMBLED PER THE D212-664-147 CROSSTUBE.

RELEASED
09/06/22/11

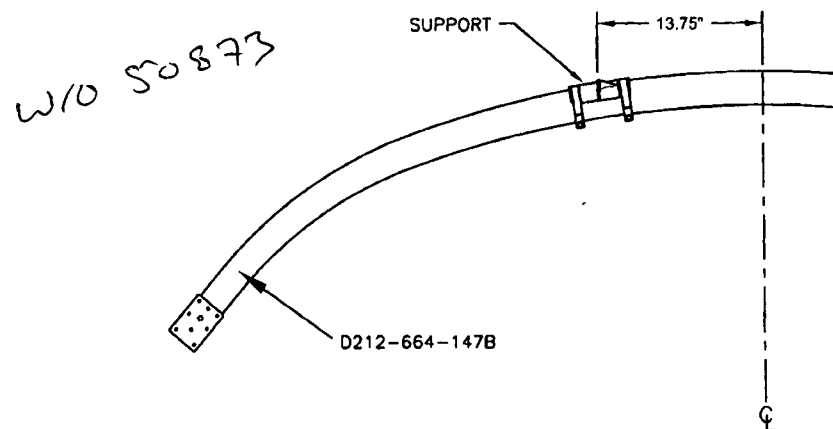


FIGURE 1 - SUPPORT INSTALLATION

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

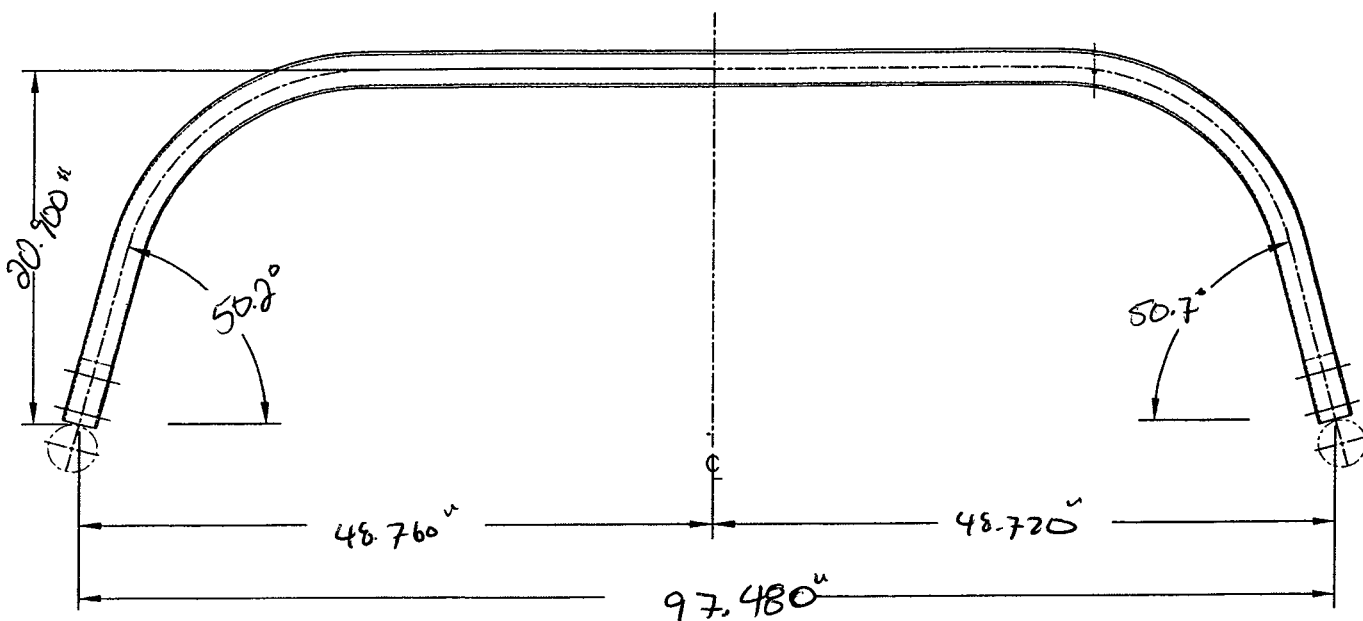
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	50873
Description: Crosstube Low Fwd (205/212/412)		Part Number:	D212-664-107
Inspection Dwg: D212-664-147 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	8
Date	09/07/30

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 14945

CLIENT	<u>DART AEROSPACE</u>	DATE	<u>AUG-10-2009</u>	PAGE	<u>1</u>	OF	<u>1</u>
ATTENTION	<u>LINDA CHANTAL</u>	ACUREN JOB NO.	<u>188-09-001484</u>	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	<u>1270 ABERDEEN ST.</u>	PO/NO.	<u>10194</u>				
	<u>HAWKESBURY ON. K6H-1K7</u>	WORK LOCATION	<u>HAWKESBURY</u>				
		ACCEPTANCE STD.	<u>ASIM 1417</u>	REV./DATE	<u>2007</u>		
PROJECT	<u>F.P.I. ON MACHINED PARTS - AND CROSS TUBES</u>						
ITEM(S) EXAMINED	<u>44 STUDS. 20 RAPPELS</u> <u>7 CROSS TUBES. + 12 STUDS.</u>						

JOB DESCRIPTION	PROCEDURE NO.	LT-0002	REV./DATE	TECHNIQUE NO.	LT-0002	REV./DATE	
PART NO.				MATERIAL	<u>STAINLESS STEEL</u>	THICKNESS	<u>THIN</u>
SCOPE	<u>WET FLOUORESCENT LIQUID PENETRANT INSPECTION</u> <u>CARRIED OUT 100% EXTERNAL</u>						

TEST DETAILS							
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED		
FAMILY BRAND	<u>MAGNAFLUX</u>			BLACK LIGHT S/N	<u>16459</u>	OUTPUT > 1000 μ W/cm ²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANT	<u>2L 67</u>	MINIMUM DWELL TIME	<u>45</u> MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER	<u>H2O</u>	MINIMUM DRY TIME	> 10 MIN.	OTHER	<u>LABING</u>		
DEVELOPER	<u>SKD 52</u>	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N			
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY	CAL DUE DATE	<u>DEC. 8 - 2009</u>		

TEST SURFACE					
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS-	<input type="checkbox"/> METRIC	<input type="checkbox"/> IMPERIAL	
14 PCS STUDS - W.O. 509 33		✓	MM 09 08 11 TO BUFF AND EXAMINE - INDICATION TO BUFF AND EXAMINE - INDICATIONS - 6 ITEMS TO EXAMINE AFTER BUFFING - OTHER PCS FOUND ACCEPTABLE TO STANDARD
20 PCS STUDS - W.O. 507 21		✓ 24 x 0	
12 PCS STUDS - W.O. 509 32		✓	
10 PCS RAPPEL - W.O. 509 67		✓	
10 PCS RAPPEL - W.O. 509 68		✓ 5 x 5	
1 CROSS TUBE - W.O. 510 83		✓	
1 CROSS TUBE - W.O. 510 84		✓	
1 CROSS TUBE - W.O. 510 85		✓	
1 CROSS TUBE - W.O. 508 73		✓	
1 CROSS TUBE - W.O. 508 27		✓	
1 CROSS TUBE - W.O. 508 00		✓	
1 CROSS TUBE - W.O. 508 26		✓	

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		DTR # <u>E-20068</u>	
CLIENT REPRESENTATIVE	<u>CHANTAL LAVOIE</u>	SIGNATURE	
TECHNICIAN (SIGNATURE):	<u>Mike Johnston</u>	REPORT REVIEWED BY:	
NAME (PRINT):	<u>Mike Johnston</u>	NAME	INITIALS
CGSB LEVEL	<u>1ST TECHNICIAN</u>	CGSB LEVEL	<u>2ND TECHNICIAN</u>
CGSB REG. No	<u>6066</u>	CGSB REG. No	

5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6*	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA
SKIDTUBES.

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Revision: F

Date: 08.09.05

REFERENCE ONLY

Work Order ID 50873

July 23, 2009 9:51:10 AM



Page 1

Item ID: D212-664-107

Revision ID: A

Item Name: Crosstube Low Standard Fwd

Start Date: 7/27/2009 Start Qty: 1.00

Required Date: 8/7/2009 Req'd Qty: 1.00

Reference:

Accept



Setup Start



Stop



Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-147

Rev A

100



DC

Document Control

DOCUMENT CONTROL

0.00

Memo

0.00

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

C26910814

110



Packaging

Packaging

Packaging

Memo

0.00

0.00

120



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

0.00

Memo

0.00

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

MP

07-07-30



REFERENCE ONLY